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| 10/709,522 | 05/11/2004 | Krishna Mohan ITIKARLAPALLI | ORCL-003 | 3521 |

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| EXAMINER |
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SANDERS, AARON J

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| ART UNIT | PAPER NUMBER |
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2168

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
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| 3 MONTHS | 02/15/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/709,522 | Applicant(s) ITIKARLAPALLI ET AL. | |
| | Examiner Aaron J. Sanders | Art Unit 2168 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This Office action has been issued in response to amendment filed 11 October 2006.

Claims 1-21 are pending. Applicant's arguments have been carefully and respectfully considered, and some are persuasive, while others are not. Accordingly, objections and rejections have been removed where arguments were persuasive, but rejections have been maintained where arguments were not persuasive. Accordingly, claims 1-26 are rejected, and this action has been made FINAL.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Raz, U.S. Pat. 5,701,480.

As per claims 1-21, Raz teaches:

1. A method of implementing an atomic transaction using a program logic, said method comprising:

requesting in said program logic a transaction identifier for said atomic transaction (See e.g. col. 7, line 57 to col. 8, line 25, "Local transactions are committed upon an explicit request from the local concurrency control mechanism");

generating said transaction identifier in a transaction manager in response to said requesting (See e.g. col. 2, lines 25-53, "To identify the transaction being performed, the transaction is typically assigned a unique 'transaction identification number'");

specifying in said program logic a plurality of combinations for execution in a sequential order, wherein each of said plurality of combinations contains said transaction identifier, a task procedure, and a rollback procedure, wherein said task procedure implements a part of said atomic transaction and said rollback procedure is designed to rollback said task procedure (See e.g. col. 8, lines 35-57, "there may exist in the database a multiplicity of uncommitted versions, each associated with a possible commitment order for transactions following the last committed transaction" which indicates, among other things, "combinations for execution" and a "task procedure" that is further described in Figs. 4A-B, which are described beginning at col. 17, line 13. See also col. 20, lines 44-64, "The transaction list includes a linked list of transaction identification numbers 106" which indicates that each transaction has an identifier, and is further described in Fig. 7. See also col. 2, lines 7-24, "The recovery unit consists of program statements between a 'START' statement and a 'COMMIT' statement. All of the statements in the 'recovery unit' must be completed before the memory records modified by the statements in the recovery unit are made available for subsequent processing... The statements in the 'recovery unit' specify operations in a single 'transaction'" where the claimed "rollback procedure" is contained in the referenced "recovery unit". The reference is software and therefore takes place in "program logic", as further described in Fig. 5A);

executing said task procedures in said sequential order (See e.g. Drawing Description, “FIGS. 24A and 24B together comprise a flowchart of a procedure for fetching a desired record using the pointers of the data structure of FIG. 4” and Figs. 24A-B);

keeping track of said rollback procedures in said transaction manager (See e.g. col. 2, lines 7-24, “The recovery unit consists of program statements between a ‘START’ statement and a ‘COMMIT’ statement” and is contained in the Transaction Manager 92 of Fig. 5A, which is further defined in Figs. 12A-B); and

executing said rollback procedures in a reverse order of said sequential order if said atomic transaction is to be aborted, wherein said rollback procedures are identified according to said keeping (See e.g. col. 5, lines 28-45, “the updated records are replaced with ‘before images’ that are obtained from the ‘undo log’ to undo the effects of the failed transactions”).

2. The method of claim 1, wherein said transaction identifier is unique to each of the atomic transactions (See e.g. col. 2, lines 25-53, “To identify the transaction being performed, the transaction is typically assigned a unique ‘transaction identification number’”).

3. The method of claim 1, wherein said keeping comprises storing data representing said rollback procedures in a stack (See e.g. col. 19, lines 51-59, “the transaction scheduler responds to an interrupt by removing the context of the interrupted transaction from the processor stack of the digital computer... The context includes the value of the program counter which points to the interrupted memory location in the transaction program”).

4. The method of claim 3, wherein said stack is stored in a memory (See e.g. col. 2, lines 7-24, “the operating system typically provides an established set of memory management

procedures that can be invoked or called from an application program to define a 'recovery unit'", where the "stack" in the reference is part of the "recovery unit").

5. The method of claim 1, further comprising examining a status returned by execution of one of said task procedures and performing said aborting if said status indicates an error (See e.g. col. 20, lines 44-64 and col. 63, lines 45-64, "a flag R indicating whether preparation of the transaction has been completed and the transaction is ready to be committed" and "the entire before-image log file for the failed process is scanned backwards to recover and un-do the effects of a failed transaction for the failed process" respectively).

6. The method of claim 1, wherein said aborting is performed asynchronously (See e.g. col. 91, line 63 to col. 92, line 6, "Later, asynchronously, if T is committed by the AC protocol, abort all the transactions in the set $ABORT_{ECO}(T)$ " where T is a transaction, see col. 85, lines 43-49).

7. A computer readable medium carrying one or more sequences of instructions representing a program logic for execution on a system, said program logic implementing an atomic transaction, wherein execution of said one or more sequences of instructions by one or more processors contained in said system causes said one or more processors to perform the actions of:

requesting an identifier for said atomic transaction (See e.g. col. 7, line 57 to col. 8, line 25, "Local transactions are committed upon an explicit request from the local concurrency control mechanism");

setting a variable to equal said identifier (See e.g. col. 2, lines 25-53, "To identify the transaction being performed, the transaction is typically assigned a unique 'transaction identification number'" and Fig. 7);

specifying a plurality of combinations for execution, wherein each of said plurality of combinations contains said transaction identifier, a task procedure, and a rollback procedure, wherein said task procedure implements a part of said atomic transaction and said rollback procedure is designed to rollback said task procedure (See e.g. col. 8, lines 35-57, "there may exist in the database a multiplicity of uncommitted versions, each associated with a possible commitment order for transactions following the last committed transaction" which indicates, among other things, "combinations for execution" and a "task procedure" that is further described in Figs. 4A-B, which are described beginning at col. 17, line 13. See also col. 20, lines 44-64, "The transaction list includes a linked list of transaction identification numbers 106" which indicates that each transaction has an identifier, and is further described in Fig. 7. See also col. 2, lines 7-24, "The recovery unit consists of program statements between a 'START' statement and a 'COMMIT' statement. All of the statements in the 'recovery unit' must be completed before the memory records modified by the statements in the recovery unit are made available for subsequent processing... The statements in the 'recovery unit' specify operations in a single 'transaction'" where the claimed "rollback procedure" is contained in the referenced "recovery unit". The reference is software and therefore takes place in "program logic", as further described in Fig. 5A); and

aborting said atomic transaction by specifying said identifier associated with an abort procedure to cause said rollback procedures to be executed (See e.g. col. 5, lines 28-45, "the

updated records are replaced with 'before images' that are obtained from the 'undo log' to undo the effects of the failed transactions" and Figs. 12A-B).

8. The computer readable medium of claim 7, wherein said specifying comprises including each of said plurality of combinations in a single procedure call (See e.g. col. 2, lines 25-53, "it is desirable to distribute the operations in a transaction among multiple processors or processes in a computing system" where, in order to distribute the processes, a single function call is made in the "computing system" passing the "transaction" to be processed).

9. The computer readable medium of claim 7, further comprising examining a status returned by execution of one of said task procedures and performing said aborting if said status indicates an error (See e.g. col. 20, lines 44-64 and col. 63, lines 45-64, "a flag R indicating whether preparation of the transaction has been completed and the transaction is ready to be committed" and "the entire before-image log file for the failed process is scanned backwards to recover and un-do the effects of a failed transaction for the failed process" respectively).

10. A computer readable medium carrying one or more sequences of instructions for supporting implementation of an atomic transaction in a system, wherein execution of said one or more sequences of instructions by one or more processors contained in said system causes said one or more processors to perform the actions of:

generating an identifier for said atomic transaction (See e.g. col. 2, lines 25-53, "To identify the transaction being performed, the transaction is typically assigned a unique 'transaction identification number'");

receiving a plurality of combinations for execution, wherein each of said plurality of combinations contains said transaction identifier, a task procedure, and a rollback procedure,

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wherein said task procedure implements a part of said atomic transaction and said rollback procedure is designed to rollback said task procedure (See e.g. col. 8, lines 35-57, "there may exist in the database a multiplicity of uncommitted versions, each associated with a possible commitment order for transactions following the last committed transaction" which indicates, among other things, "combinations for execution" and a "task procedure" that is further described in Figs. 4A-B, which are described beginning at col. 17, line 13. See also col. 20, lines 44-64, "The transaction list includes a linked list of transaction identification numbers 106" which indicates that each transaction has an identifier, and is further described in Fig. 7. See also col. 2, lines 7-24, "The recovery unit consists of program statements between a 'START' statement and a 'COMMIT' statement. All of the statements in the 'recovery unit' must be completed before the memory records modified by the statements in the recovery unit are made available for subsequent processing... The statements in the 'recovery unit' specify operations in a single 'transaction'" where the claimed "rollback procedure" is contained in the referenced "recovery unit". The reference is software and therefore takes place in "program logic", as further described in Fig. 5A);

executing said task procedures (See e.g. Drawing Description, "FIGS. 24A-B together comprise a flowchart of a procedure for fetching a desired record using the pointers of the data structure of FIG. 4" and Figs. 24A-B); and

executing said rollback procedures in response to receiving an abort request (See e.g. col. 5, lines 28-45, "the updated records are replaced with "before images" that are obtained from the "undo log" to undo the effects of the failed transactions").

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11. The computer readable medium of claim 10, wherein said task procedures are executed in an execution order and corresponding rollback procedures are executed in a reverse order of said execution order (See e.g. col. 2, lines 7-24, "The recovery unit consists of program statements between a 'START' statement and a 'COMMIT' statement. All of the statements in the 'recovery unit' must be completed before the memory records modified by the statements in the recovery unit are made available for subsequent processing... The statements in the 'recovery unit' specify operations in a single 'transaction'").

12. The computer readable medium of claim 11, further comprising storing data indicating that said rollback procedures are to be executed in said reverse order to abort said atomic transaction (See e.g. col. 2, lines 7-24, "The recovery unit consists of program statements between a 'START' statement and a 'COMMIT' statement. All of the statements in the 'recovery unit' must be completed before the memory records modified by the statements in the recovery unit are made available for subsequent processing... The statements in the 'recovery unit' specify operations in a single 'transaction'").

13. The computer readable medium of claim 12, wherein said identifier is generated to be unique for each atomic transaction (See e.g. col. 2, lines 25-53, "To identify the transaction being performed, the transaction is typically assigned a unique 'transaction identification number'").

14. The computer readable medium of claim 12, wherein said data is represented in the form of a stack (See e.g. col. 19, lines 51-59, "the transaction scheduler responds to an interrupt by removing the context of the interrupted transaction from the processor stack of the digital computer... The context includes the value of the program counter which points to the interrupted memory location in the transaction program").

15. The computer readable medium of claim 14, wherein said stack is stored in a memory (See e.g. col. 2, lines 7-24, "the operating system typically provides an established set of memory management procedures that can be invoked or called from an application program to define a 'recovery unit'", where the "stack" in the reference is part of the "recovery unit").

16. A computer system comprising:

a memory storing a plurality of instructions (See e.g. col. 2, lines 7-24, "the operating system typically provides an established set of memory management procedures that can be invoked or called from an application program to define a 'recovery unit.' The recovery unit consists of program statements between a 'START' statement and a 'COMMIT' statement"); and

a processing unit coupled to said memory and executing said plurality of instructions to support implementation of an atomic transaction in a programming environment, said processing unit being operable to (See e.g. Fig. 1, Central Processing Unit 21 and Volatile Random Access Memory 22):

request in a program logic a transaction identifier for said atomic transaction (See e.g. col. 7, line 57 to col. 8, line 25, "Local transactions are committed upon an explicit request from the local concurrency control mechanism");

generate said transaction identifier in a transaction manager in response to said requesting (See e.g. col. 2, lines 25-53, "To identify the transaction being performed, the transaction is typically assigned a unique 'transaction identification number'");

specify in said program logic a plurality of combinations for execution in a sequential order, wherein each of said plurality of combinations contains said transaction identifier, a task

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procedure, and a rollback procedure, wherein said task procedure implements a part of said atomic transaction and said rollback procedure is designed to rollback said task procedure (See e.g. col. 8, lines 35-57, "there may exist in the database a multiplicity of uncommitted versions, each associated with a possible commitment order for transactions following the last committed transaction" which indicates, among other things, "combinations for execution" and a "task procedure" that is further described in Figs. 4A-B, which are described beginning at col. 17, line 13. See also col. 20, lines 44-64, "The transaction list includes a linked list of transaction identification numbers 106" which indicates that each transaction has an identifier, and is further described in Fig. 7. See also col. 2, lines 7-24, "The recovery unit consists of program statements between a 'START' statement and a 'COMMIT' statement. All of the statements in the 'recovery unit' must be completed before the memory records modified by the statements in the recovery unit are made available for subsequent processing... The statements in the 'recovery unit' specify operations in a single 'transaction'" where the claimed "rollback procedure" is contained in the referenced "recovery unit". The reference is software and therefore takes place in "program logic", as further described in Fig. 5A);

execute said task procedures in said sequential order (See e.g. Drawing Description, "FIGS. 24A-B together comprise a flowchart of a procedure for fetching a desired record using the pointers of the data structure of FIG. 4" and Figs. 24A-B);

keep track of said rollback procedures in said transaction manager (See e.g. col. 2, lines 7-24, "The recovery unit consists of program statements between a 'START' statement and a 'COMMIT' statement" and is contained in the Transaction Manager 92 of Fig. 5A, which is further defined in Figs. 12A-B); and

execute said rollback procedures in a reverse order of said sequential order if said atomic transaction is to be aborted, wherein said rollback procedures are identified according to said keeping (See e.g. col. 5, lines 28-45, "the updated records are replaced with 'before images' that are obtained from the 'undo log' to undo the effects of the failed transactions").

17. The computer system of claim 16, wherein said transaction identifier is unique to each of the atomic transactions (See e.g. col. 2, lines 25-53, "To identify the transaction being performed, the transaction is typically assigned a unique 'transaction identification number'").

18. The computer system of claim 16, wherein said processing unit is operable to store data representing said rollback procedures in a stack to perform said keep (See e.g. col. 19, lines 51-59, "the transaction scheduler responds to an interrupt by removing the context of the interrupted transaction from the processor stack of the digital computer... The context includes the value of the program counter which points to the interrupted memory location in the transaction program").

19. The computer system of claim 18, wherein said stack is stored in a memory (See e.g. col. 2, lines 7-24, "the operating system typically provides an established set of memory management procedures that can be invoked or called from an application program to define a 'recovery unit'", where the "stack" in the reference is part of the "recovery unit").

20. The computer system of claim 16, wherein said processing unit is further operable to examine a status returned by execution of one of said task procedures and to perform said aborting if said status indicates an error (See e.g. col. 20, lines 44-64 and col. 63, lines 45-64, "a flag R indicating whether preparation of the transaction has been completed and the transaction is ready to be committed" and "the entire before-image log file for the failed process is scanned

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backwards to recover and un-do the effects of a failed transaction for the failed process” respectively).

21. The computer system of claim 16, wherein said processing unit is operable to execute said rollback procedures asynchronously (See e.g. col. 91, line 63 to col. 92, line 6, “Later, asynchronously, if T is committed by the AC protocol, abort all the transactions in the set $ABORT_{ECO}(T)$ ” where T is a transaction, see col. 85, lines 43-49).

Response to Arguments

As per Applicant’s arguments that Raz does not anticipate all the limitations of claims 1, 7, 10, and 16, the Examiner respectfully disagrees, and has further explained the rejections supra. In examining the instant claims, the Examiner applied the broadest reasonable interpretations to the claim limitations. While Raz’s disclosure as a whole may not be equivalent to Applicant’s disclosure as a whole, what matters is that Raz does disclose the Applicant’s claim limitations. The Examiner believes that given the above explanations of the rejections, the Applicant will now understand how Raz applies to the instant claims.

As per Applicant’s argument that Raz’s “post-processing” is not equivalent to a “rollback”, the Examiner respectfully disagrees. The Examiner cited col. 2, lines 7-24, “The recovery unit consists of program statements between a ‘START’ statement and a ‘COMMIT’ statement. All of the statements in the ‘recovery unit’ must be completed before the memory records modified by the statements in the recovery unit are made available for subsequent processing... The statements in the ‘recovery unit’ specify operations in a single ‘transaction’” where the claimed “rollback procedure” is contained in the referenced “recovery unit”. The

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Examiner also cited col. 5, lines 28-45 in reference to the execution of a rollback;

“Recoverability is further ensured by flushing to an ‘undo’ log the ‘before-images’ of records to be updated, and then flushing the updated records to state memory just before a transaction is committed. If a crash occurs, the updated records are replaced with ‘before images’ that are obtained from the ‘undo log’ to undo the effects of the failed transactions”. The combination of these two citations clearly shows that while Raz may not use the term “rollback”, that is clearly what is taking place in the case of a failure to commit: The database is being returned to a previous state.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron J. Sanders whose telephone number is 571-270-1016. The examiner can normally be reached on M-Th 8:00a-5:00p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vo Tim can be reached on 571-272-3642. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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